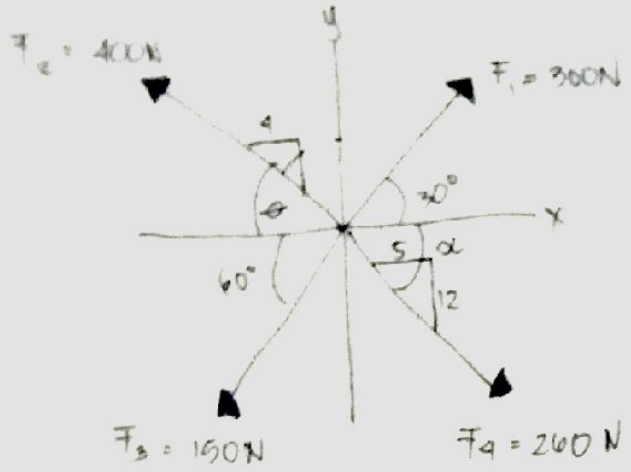
... Cedie C. Fernandez BSGE - 2

(1)



$\tan\theta = \left(\frac{3}{4}\right)$ $\tan\alpha = \left(\frac{12}{5}\right)$

$\theta = \tan^{-1}\left(\frac{3}{4}\right)$ $\alpha = \tan^{-1}\left(\frac{12}{5}\right)$

$\theta = 36.87°$ $\alpha = 67.38°$

$F_{1x} = 300 \cos 30°$
$= 259.808$

$F_{1y} = 300 \sin 30$
$= 150$

$F_{2x} = 400 \cos 143.13°$
$= -319.9996$

$F_{2y} = 400 \sin 143.13°$
$= 240.006$

$F_{3x} = 150 \cos 240°$
$= -75$

$F_{3y} = 150 \sin 240°$
$= -129.909$

$F_{4x} = 260 \cos 292.62°$
$= 100.001$

$F_{4y} = 260 \sin 292.62°$
$= -239.9998$

$\Sigma F_x = 259.808 + (-319.9996) + (-75) + 100.001$
$= -35.1906$

$\Sigma F_y = 150 + 240.001 + (-129.909) + (-239.9998)$
$= 20.0972$

$|R| = \sqrt{(\Sigma F_x)^2 + (\Sigma F_y)^2}$
$= \sqrt{(-35.1906)^2 + (20.0972)^2}$

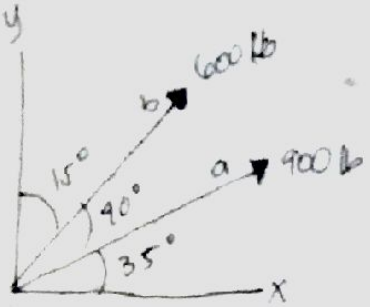
$\boxed{|R| = 40.525N}$

$\tan\theta = \frac{\Sigma F_y}{\Sigma F_x}$

$\tan\theta = \frac{20.0972}{-35.1906}$

$\boxed{\theta = -29.731°}$

(2)



$a_x = 900 \cos 35°$
$= 737.2368$

$a_y = 900 \sin 35°$
$= 516.219$

$b_x = 600 \cos 75°$
$= 155.291$

$b_y = 600 \sin 75°$
$= 579.555$

$\Sigma ab_x = 737.2368 + 155.291$
$= 892.5278$

$\Sigma ab_y = 516.219 + 579.555$
$= 1095.774$

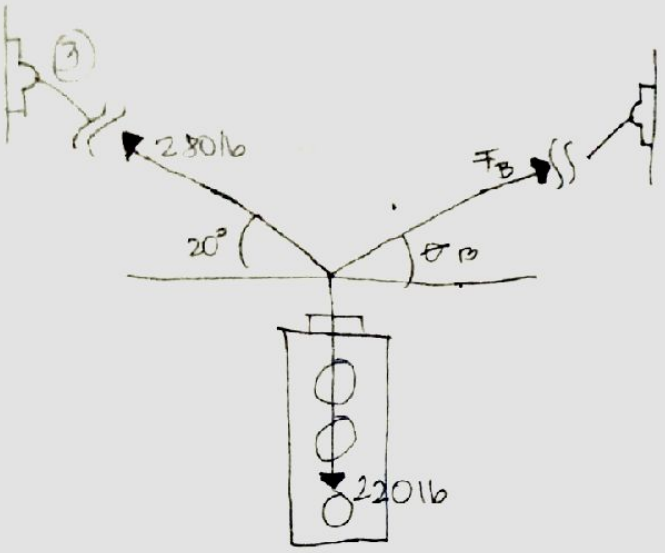
$|R| = \sqrt{(\Sigma a_x)^2 + (\Sigma b_x)^2}$
$= \sqrt{(892.5278)^2 + (1095.774)^2}$

$\boxed{|R| = 1413.2686 lb}$

$\tan\theta = \frac{\Sigma aby}{\Sigma abx}$

$\theta = \tan^{-1}\left(\frac{1095.774}{892.5278}\right)$

$\boxed{\theta = 50.937°}$



$$X_{FA} = 280 \cos(160°)$$

$$= -263.114 \text{ lb}$$

$$y_{FA} = 280 \sin(160°)$$

$$= 95.766 \text{ lb}$$

$$X_{FC} = 220 \cos 270$$

$$= 0 \text{ lb}$$

$$y_{FC} = 220 \sin 270$$

$$= -220 \text{ lb}$$

$$X_R = X_{FA} + X_{FB} + X_{FC}$$

$$0 = -263.114 + X_{FB} + 0$$

$$X_{FB} = 263.114 \text{ lb}$$

$$y_R = y_{FA} + y_{FB} + y_{FC}$$

$$0 = 95.766 + y_{FB} + (-220)$$

$$y_{FB} = 124.234 \text{ lb}$$

$$|FB| = \sqrt{X_{FB}^2 + Y_{FB}^2}$$

$$|FB| = \sqrt{263.114^2 + 124.234^2}$$

$$\boxed{|FB| = 290.969 \text{ lb}}$$

$$\tan\theta = \frac{y_{FB}}{X_{FB}}$$

$$\theta = \tan^{-1}\left(\frac{124.234}{263.114}\right)$$

$$\boxed{\theta_B = 25.275°}$$